

REMARKS

Claims 1-10 are pending in the application and are at issue.

This response is submitted in accordance with 37 C.F.R. §1.116(a) and §1.116(b) in order to present the rejected claims in a better form for allowance or appeal. The amendment is necessary to eliminate rejections under 35 U.S.C. §102(b) and §103. This amendment was not presented earlier because applicants believed, and still believe that all outstanding issues were addressed and overcome in Amendment "A" filed March 24, 2006. This amendment should be entered because it places the application in better form for allowance or appeal, and the amendment does not require further searching or present any new issues.

The courteous telephonic interview granted by Examiner Bernshteyn to applicants' undersigned attorney on September 11, 2006 is hereby noted with appreciation. During the interview, the Office Action, cited reference, claimed invention, and proposed claim amendments were discussed.

Claim 1 has been amended to improve the form of the claim and more clearly recite that a *solid* sodium acrylate is utilized in the claimed process.

First, it is assumed that the present Office Action contains a typographical error in citing a rejection under 35 U.S.C. § 102(e). It appears that the rejection should be under 35 U.S.C. § 102(b), as set forth in the Office Action of October 27, 2005.

Claims 1-5 and 8-10 stand rejected under U.S.C § 102(b) as being anticipated by Tsubakimoto et al. U.S. Patent No. 4,286,082 ('082). Claims 6 and 7 stand rejected under 35 U.S.C. §103 as being obvious over the '082 patent. For the reasons set forth below, it is submitted that these rejections are in error and should be withdrawn.

As a follow-up to the telephonic interview of September 11, 2006, applicants provide the following brief description of the standard method of preparing superabsorbent polymers (SAPs), such as described in the '082 patent, and the presently claimed method. This will be followed by a discussion of the '082 patent, and the patentable differences

between the present claims and the '082 patent. This description is provided to more clearly explain the presently claimed invention and the benefits achieved by the presently claimed invention.

Standard method of preparing SAPs-

SAPs typically are prepared by neutralizing an aqueous *solution* of acrylic acid to about 75 to about 100 mol% by adding sodium hydroxide, or a similar base, to an *aqueous solution* of acrylic acid, or vice versa, by adding acrylic acid to an aqueous sodium hydroxide solution. This neutralization is conducted *in situ* to provide a monomer solution having the desired weight percent of monomer at the desired mole % neutralization. The neutralized acrylic acid then is polymerized.

Because of the extremely high reactivity of unneutralized acrylic acid (AA), commercial AA contains a stabilizer to control premature polymerization. Unless removed from the AA, the stabilizers impart a color to SAPs. At times, the stabilizers are removed by distillation or absorption. Alternatively, the AA is polymerized immediately after synthesis. See English-language specification, page 1, lines 36-44.

Acrylic acid also dimerizes during storage, which presents a different problem. The AA dimer can polymerize. However, during subsequent process steps (e.g., drying) and/or storage, the AA dimer present in the SAP cleaves to regenerate monomeric AA, which appears as residual AA in the final SAP product.

An example of the standard process for preparing an SAP is set forth in the English-language specification as "Comparative example 1" at pages 5 and 6. Note that the AA is neutralized in solution with aqueous sodium hydroxide to provide a *solution* of neutralized sodium acrylate (specification, page 5, lines 37-44). The sodium acrylate *solution* then was polymerized (page 6, lines 1-20). A *solid* sodium acrylate was *not* used in the polymerization.

Presently claimed method of preparing SAPs-

The present method overcomes the problems of the standard method of preparing SAPs related to discoloration from the AA stabilizer and residual AA from AA dimer formation. In particular, these problems are avoided by adding *solid* sodium acrylate to the solution used in the polymerization step. In particular, AA is neutralized with sodium hydroxide (or similar base) to provide an aqueous solution of sodium acrylate. The sodium acrylate *then is precipitated* from the aqueous solution by the addition of an alcohol, and is *separated* and *dried* to provide *anhydrous* sodium acrylate. The impurities found in acrylic acid, i.e., stabilizers, AA dimers, and other unidentified impurities, remain in solution and do not precipitate with the sodium acrylate.

The resulting *purified* and *solid* sodium acrylate then is used in the polymerization reaction to produce an SAP hydrogel. The sodium acrylate can be anhydrous, if freshly prepared or protected from the atmosphere, or can contain from 0.1% to 10%, by weight, water because sodium acrylate is hygroscopic. Regardless, the sodium acrylate used to prepare the monomer solution is a *solid* and eliminates the above-described impurities found in AA from the polymerization process.

The specification provides an example of the present method of producing an SAP at page 7. Note that *unlike* Comparative example 1 discussed above (in which sodium acrylate was produced *in situ* and directly used), the inventive example uses *solid* sodium acrylate to prepare the monomer solution (page 7, lines 3-7). The data in the specification shows that the inventive method substantially reduced the amount of residual AA monomer and had a better, i.e., whiter color.

Therefore, using solid sodium acrylate in a polymerization process to provide an SAP hydrogel, as opposed to using the sodium acrylate prepared *in situ*, yields an SAP of improved color and reduced residual monomer content. See, English-language specification, page 2, lines 1-4. The solid sodium acrylate utilized in the present invention is discussed in the English-language specification, page 2, line 14 through page 3, line 7.

The '082 patent and the Claim Rejections

The '082 patent is directed to the standard prior art method of preparing an SAP, wherein, a solution of AA is partially neutralized with sodium hydroxide to provide a monomer solution containing sodium acrylate and unneutralized AA. The sodium acrylate is prepared *in situ* and is not added to the monomer solution as a *solid*, which is a recited element of each of the original and pending claims.

In particular, the '082 patent, at column 3, lines 20-22, states that the "acrylate salt monomer (B) used in the present invention is composed of 0 to 50 mol % of acrylic acid and 50 to 100 mol% of an alkali metal acrylate." The '082 patent does not disclose how this monomer (B) was produced. The examples of '082 further state that a solution of sodium acrylate and AA was used (e.g., Example 1, column 7, lines 32-38). The '082 patent contains *no* disclosure relating to using a *solid* sodium acrylate as the source of a monomer in the preparation of an SAP.

It is axiomatic that a reference *must* teach *every* element of a claim in order for the reference to anticipate the claim. The identical invention must be shown *in as complete a detail* as is contained in the claims. The '082 patent fails to teach or suggest using *solid* sodium acrylate to form the monomer solution, as presently claimed.

The examiner relies upon *In re Schaumann* to support the anticipation rejection under 35 U.S.C. §102(b). It is submitted that reliance upon this decision is misplaced. That case involved a claimed specific *compound* that fell within a generic formula of a cited reference that embraced a limited number of related compounds. In that case, the claimed subject matter was *specifically* disclosed in the reference, which is not situation at bar. The present situation is more like *Akzo N.V. v. International Trade Comm'n*, 808 F.2d 1471 (Fed Cir. 1986) in which a disclosure of using sulfuric acid solution did *not* anticipate a method using 98% sulfuric acid because the reference did *not* disclose 98% sulfuric acid.

Because the '082 patent fails to disclose every element recited in the present claims, the '082 patent cannot anticipate the claims 1-5 and 8-10 under 35 U.S.C. §102(b). It

is further submitted that present claims 1-10 would not have been obvious over the '082 patent.

First, the '082 patent fails to teach or suggest using a solid sodium acrylate as a component to form a monomer solution. The '082 patent teaches the standard method of providing an alkali metal acrylate, i.e., an *in situ* neutralization of AA. Persons skilled in the art would not have been motivated to use solid sodium acrylate to form the monomer solution from the teachings of the '082 patent, which does not even consider or address problems related to the source of the alkali metal acrylate, e.g., discoloration and excess residual monomers in the SAP, let alone teach or suggest any way to overcome these problems.

Second, the presently claimed invention provides unexpected results. As demonstrated by the example and comparative example in the specification, SAPs prepared according to the presently-claimed process contain less residual monomer and have an improved white color compared to SAPs prepared from an sodium acrylate prepared *in situ*. These unexpected results are based on using solid sodium acrylate, which has a reduced level of impurities. As disclosed in the specification (page 1, lines 9 to 17), solid sodium acrylate can be prepared by precipitation from methanolic solutions. Acrylic acid contains impurities that are removed by precipitation of solid sodium acrylate. The precipitation step acts as purification step, and the precipitated solid sodium acrylate does not deteriorate on storing.

Persons skilled in the art, after reading the '082 patent, would have had no motivation or incentive to substitute a solid sodium acrylate for sodium acrylate prepared *in situ* with any reasonable expectation of achieving the new and unexpected results achieved by the presently claimed invention. The '082 patent simply provides no motivation for a person skilled in the art to vary from the standard procedure of generating sodium acrylate *in situ*, and absolutely provides no suggestion or hint that a change from this standard procedure would provide whiter SAPs having a reduced amount of residual monomers.

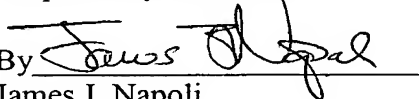
In summary, for the reasons set forth above, not only are the present claims novel over the '082 patent, but the present claims also would not have been obvious over the '082 patent under 35 U.S.C. §103. The cited reference simply does not teach, suggest, or even address, using a solid sodium acrylate in the preparation of an SAP.

It is submitted that the claims are in a proper form for allowance. An early and favorable action on the merits is requested.

Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.

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Respectfully submitted,

By 

James J. Napoli

Registration No.: 32,361
MARSHALL, GERSTEIN & BORUN
233 S. Wacker Drive, Suite 6300
Sears Tower
Chicago, Illinois 60606-6357
(312) 474-6300
Attorney for Applicant